Bronchiectasis

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Definition, Epidemiology

- Defined as :

➢ Chronic suppurative airway infection associated with irreversible enlargement and dilatation of the airways due to destruction of airways architecture.

Epidemiology

✓ approximately 40 /100.000 (est.)

✓ more in women

✓ more in elderly population

✓ more in societies with pure access to health care

Causes of bronchiectasis

❖Congenital

- Cystic fibrosis
- Ciliary dysfunction syndromes:
  - Primary ciliary dyskinesia (immotile cilia syndrome)
  - Kartagener's syndrome (sinusitis and transposition of the viscera)
- Primary hypogammaglobulinaemia
- Congenital anatomical defects
- Bronchopulmonary sequestration
- William-Campbell syndrome
- Mounier-Kuhn syndrome
- Swyer-james syndrome
- Yellow nail syndrome

Causes

- Acquired:
- *Respiratory childhood infections*

✓ Pertussis

✓ Measles

✓ Tuberculosis

- Bronchial obstruction
- Foreign body
- Chronic aspiration
- Endobronchial tumour:
- Lymph nodes (tuberculosis, sarcoidosis, and malignancy) .
- Granulomata (tuberculosis, sarcoidosis
- Immunodeficiency(Acquired Immunodeficiency syndrome (AIDS)

Causes

❖Acquired:

- ❑ Allergic bronchopulmonary *aspergillosis*
- ❑ Autoimmune *diseases*
- ✓ Rheumatoid arthritis (Rheumatoid lung)
- ✓ Sjogren syndrome
- ✓ Inflammatory bowel disease (ulcerative colitis>Crohn's disease
- ❑ Fibrosis
- ❑ Idiopathic
- ❑ Tuberculosis is the most common worldwide.

pathophysiology

- A vicious cycle
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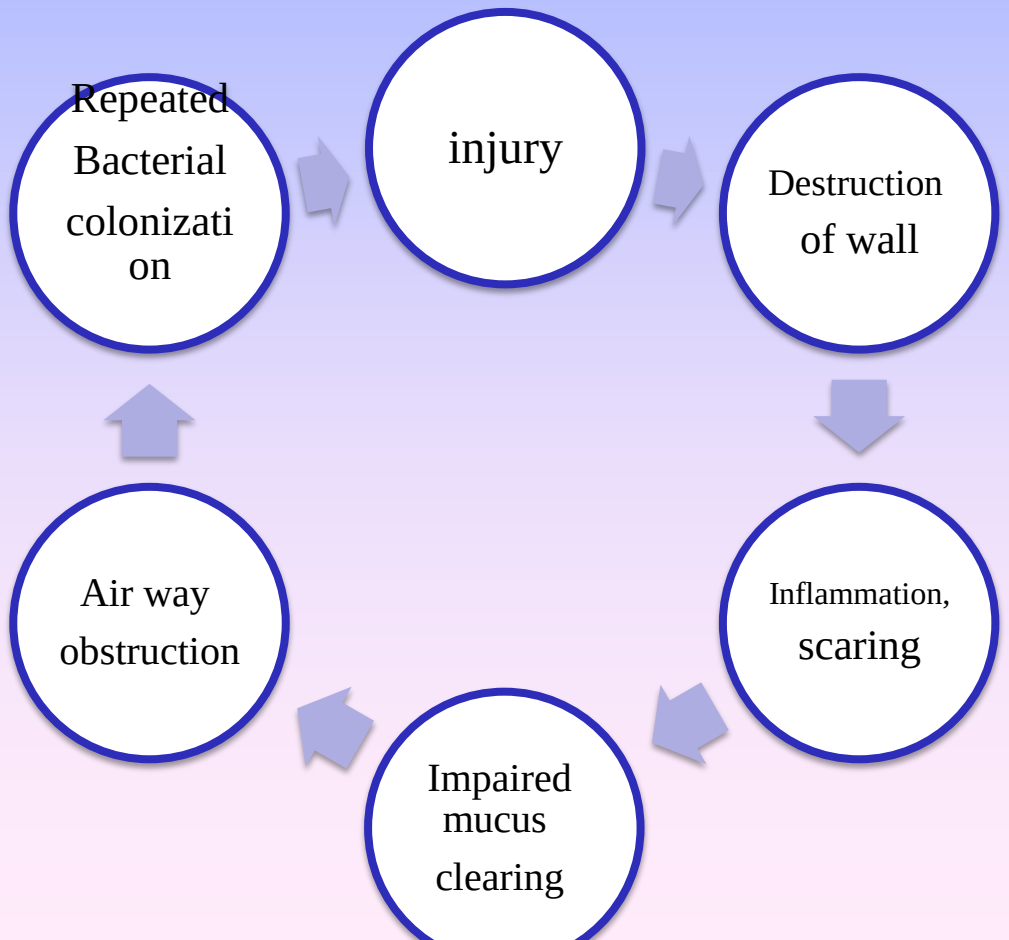


Clinical features

- **Cough**: chronic, daily, persistent
- **Sputum**: copious, continuously purulent
- **Pleuritic pain**: when infection spreads to involve pleura, or with segmental collapse due to retained secretions
- **Haemoptysis**:
  Streaks of blood common, larger volumes with exacerbations of infection
  Massive haemoptysis requiring bronchial artery embolisation sometimes occurs
- **Infective exacerbation**: increased sputum volume with fever, malaise, anorexia
- **Halitosis**: frequently accompanies purulent sputum
- **General debility**: difficulty maintaining weight, anorexia, exertional breathlessness

Clinical features

- Physical findings

❖General

✓ Cachexia ,cynosis ,finger clubbing ,ll oedema

❖Local

✓ Chest findings may be unilateral or bilateral.

✓ The hallmark auscultatory findings are coarse crepitations, which alter with coughing

✓ Collapse with retained secretions blocking a proximal bronchus may lead to locally diminished breath sounds, while advanced disease may cause scarring and overlying bronchial breathing.

✓ Scattered wheeze may be present in up to a third of cases.

Symptoms of Acute Exacerbation of Bronchiectasis*†

- Change in sputum production
- Increased dyspnea
- Increased cough
- Fever (temperature, >38° C)
- Increased, wheezing
- Malaise, fatigue, lethargy, or decreased exercise tolerance
- Reduced pulmonary function
- Radiographic changes consistent with a new pulmonary process
- Changes in chest sounds

* In the study by O'Donnell et al, a patient with four of these symptoms was defined as having an acute exacerbation.

Diagnosis

- **The purpose of evaluation:**
  1. radiographic confirmation
  2. potentially treatable causes?
  3. functional assessment

- **Evaluation:**
  - history / examination
  - laboratory testing
  - radiographic imaging
  - pulmonary function testing
  - other testing

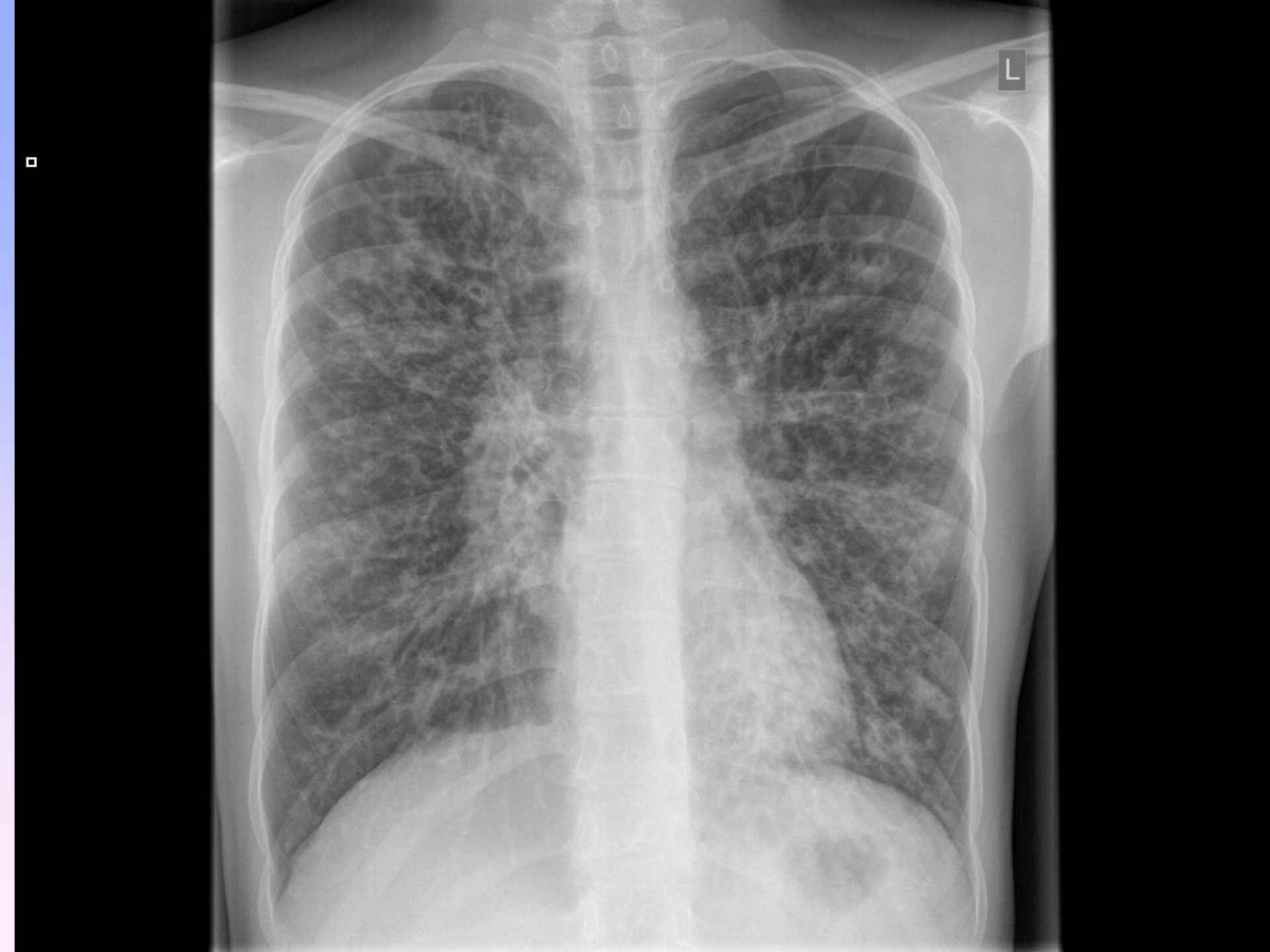
Radiology

❖CXR

✓ Bronchiectasis, unless very gross, is not usually apparent on a chest X-ray.

✓ In advanced disease,

- thickened airway walls,
- cystic bronchiectatic spaces
- and associated areas of pneumonic consolidation or collapse may be visible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Radiology

- Chest CT scan
- CT is much more sensitive,HRCT scan is the prefered method
- and shows thickened, dilated airways.
- Bronchiectasis is defined by bronchial dilatation as suggested by one or more of the following:
- Bronchoarterial ratio >1(internal airway lumen vs adjacent
- pulmonary artery)
- Lack of tapering
- Airway visibility within 1 cm of costal pleural surface or touching mediastinal pleura.

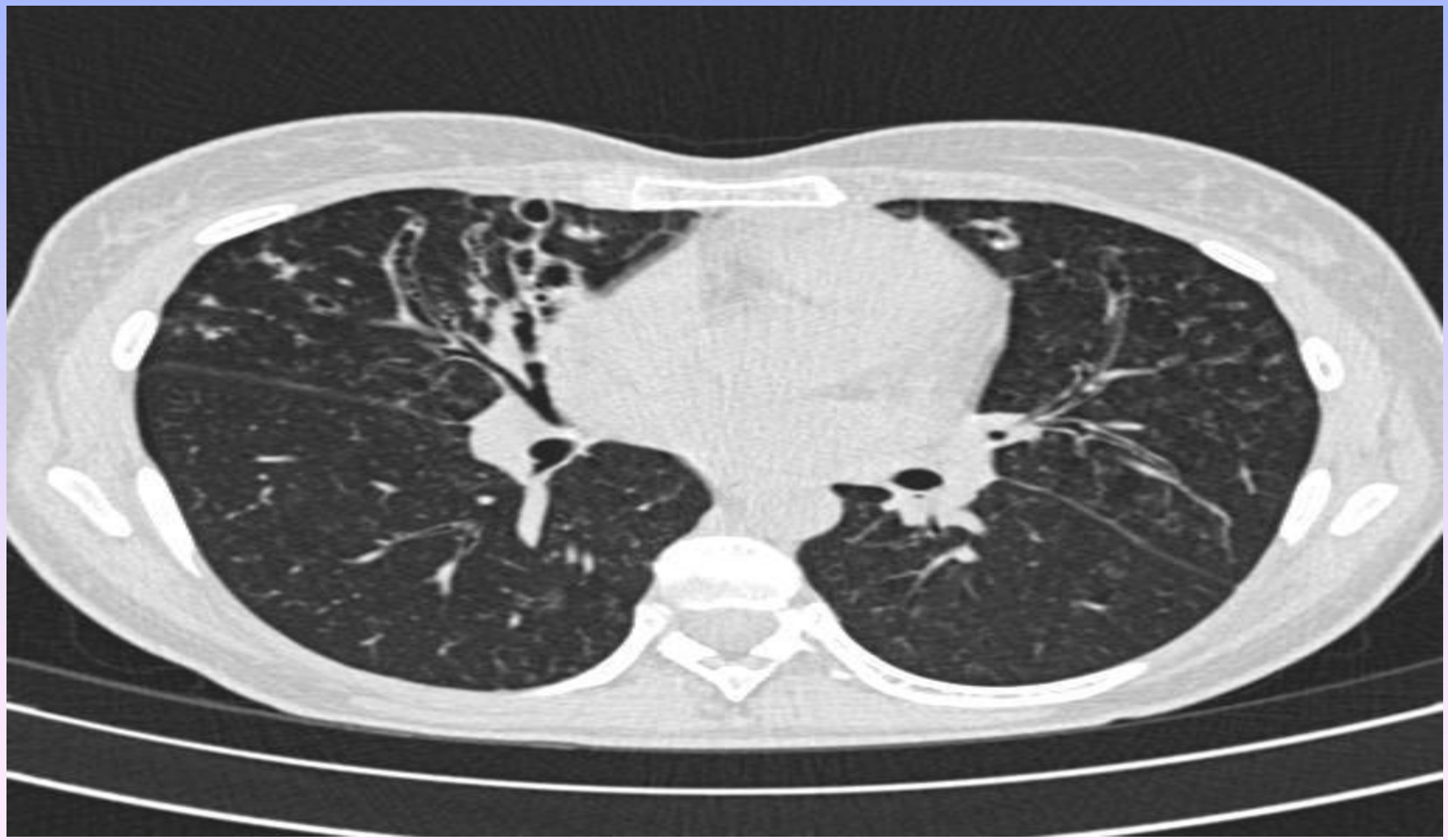
Radiology

- The following indirect signs are commonly associated with bronchiectasis:

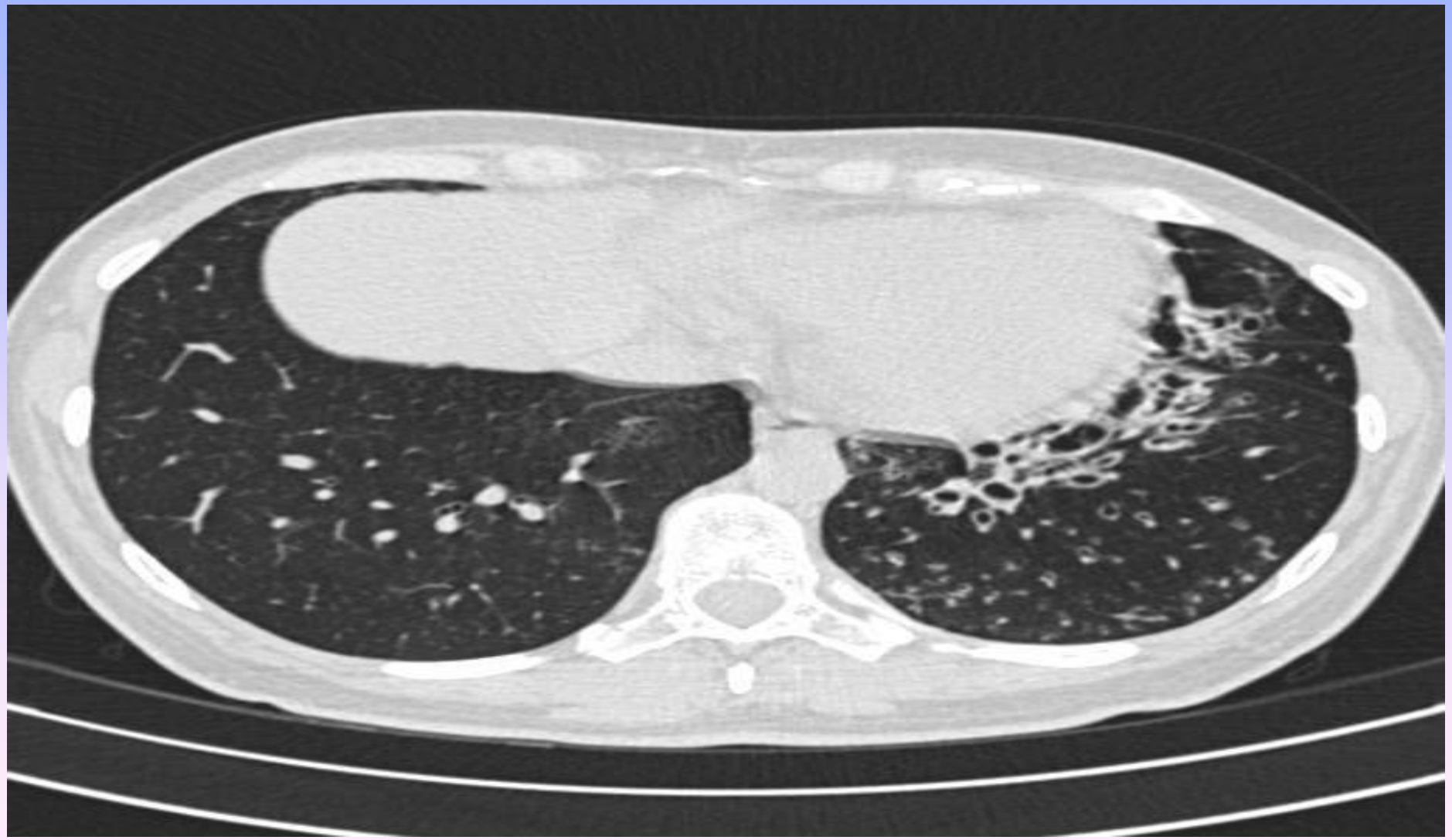
oo Bronchial wall thickening

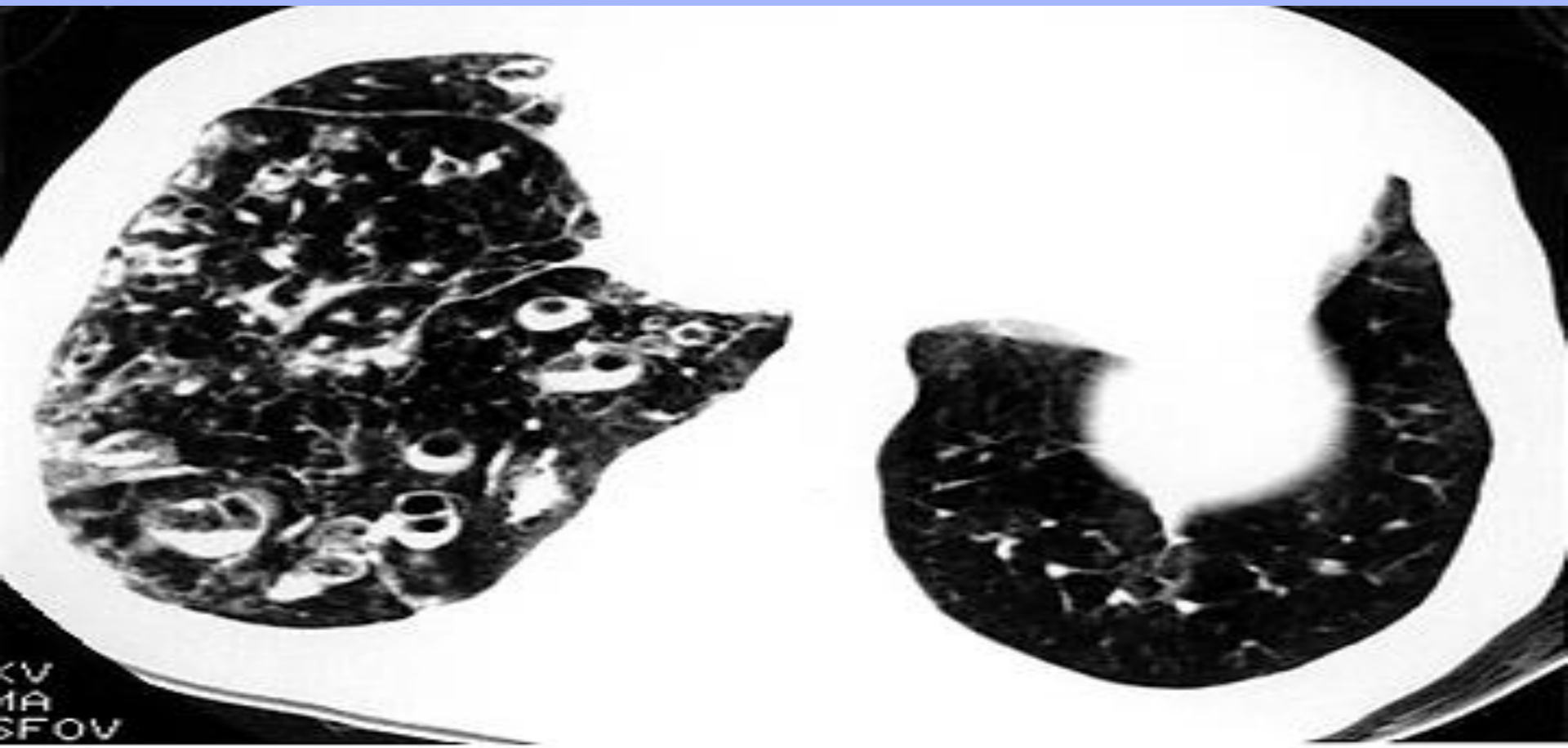
oo Mucus impaction

oo Mosaic perfusion/air trapping on expiratory CT



CT SCAN FINDINGS





Bronchiectasis HRCT shows numerous ring shadows representing dilated airways in the right lung, many of which are partially filled with secretions (arrow). Courtesy of Alan Barker, MD.

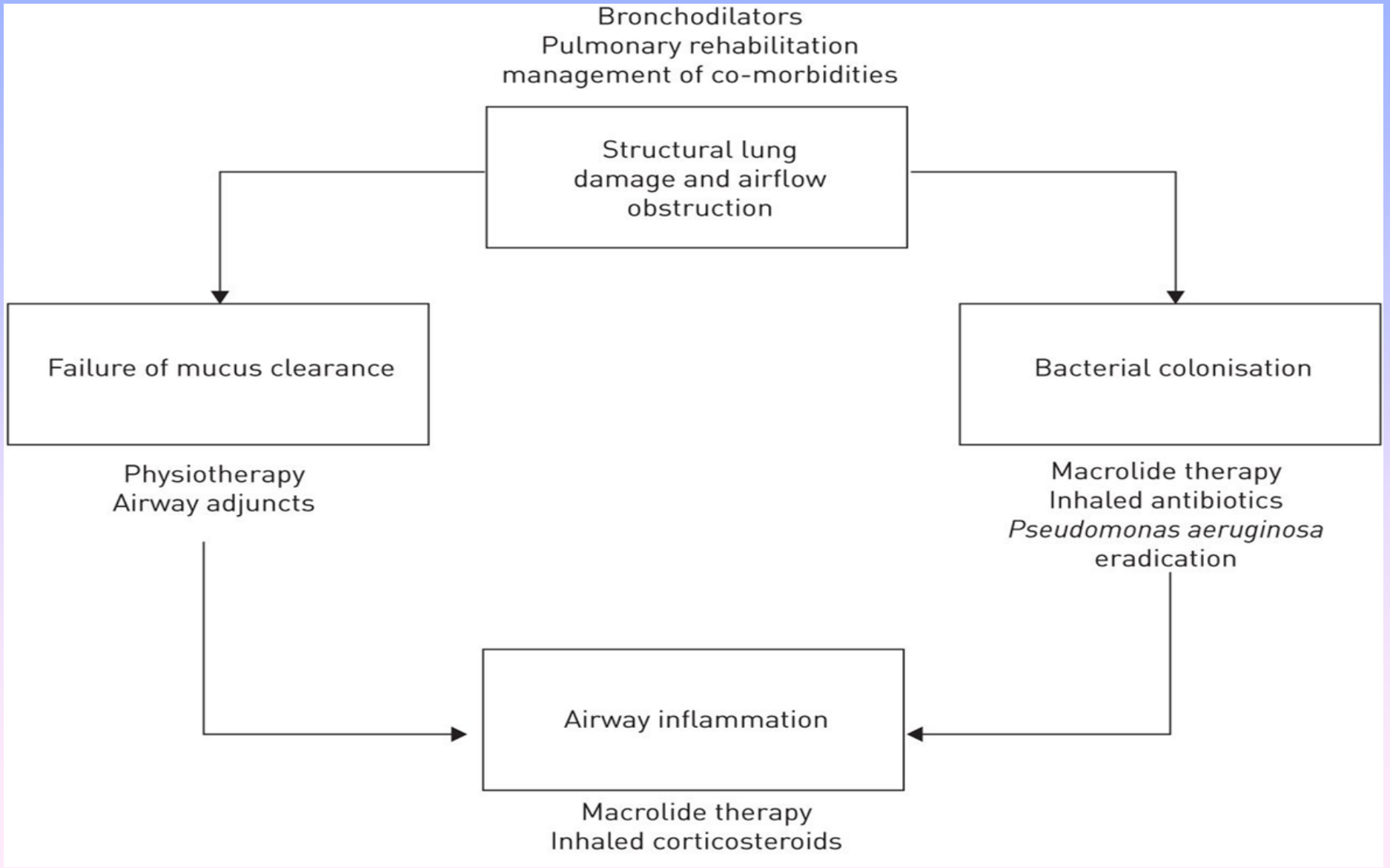
OTHER INVESTIGATIONS

- To identify the cause
- serum total IgE and specific IgE or skin prick test to Aspergillus in all patients to investigate for Allergic Broncho Pulmonary Aspergillosis.
- Measure serum IgG, IgA and IgM in all patients with bronchiectasis to exclude immunodeficiency
- Test for cystic fibrosis in patients with supporting clinical features.
- Test for primary ciliary dyskinesia (PCD) in patients with supporting clinical features. Measurement of nasal nitric oxide is the first line investigation, saccharin test. Ciliary beat frequency may also be assessed from biopsies taken from the nose. Structural abnormalities of cilia can be detected by electron microscopy.
- Mantoux test

OTHER INVESTIGATIONS

- ❖ Functional assessment
- ✓ PFT (obstructive or mixed)
- ❖ To improve treatment
- ✓ Send sputum cultures in all patients with bronchiectasis for routine and mycobacterial culture whilst clinically stable.
- ❖ Others
- ✓ CBC
- ✓ Urine analysis ,s creatinine
- ✓ Immune work up when indicated
- ✓ Bronchoscopy to exclude obstructive lesion
- ✓ alpha 1 – antitrypsin (concentracion / phenotype)

management


Bronchodilators
Pulmonary rehabilitation
management of co-morbidities
Structural lung damage and airflow obstruction
Failure of mucus clearance
Bacterial colonisation
Physiotherapy
Airway adjuncts
Macrolide therapy
Inhaled antibiotics
Pseudomonas aeruginosa eradication
Airway inflammation
Macrolide therapy
Inhaled corticosteroids

General treatment

- Stop smoking
- Adequate nutritional intake and supplementation if necessary
- Immunizations for influenza and pneumococcal pneumonia
- Confirm immunity to measles, pertussis, and rubella
- Long-term oxygen therapy in advanced cases
- Multi-disciplinary management addressing all aspects of disease in cystic fibrosis

Physiotherapy

- perform regular daily physiotherapy to assist the drainage of excess bronchial secretions.
- Patients should lie in a position in which the lobe to be drained is uppermost.
- Deep breathing, followed by forced expiratory manoeuvres
- (the ‘active cycle of breathing’ technique), helps to move secretions in the dilated bronchi towards the trachea, from which they can be cleared by vigorous coughing.
- Devices that increase airway pressure either by a constant amount (positive expiratory pressure mask) or in an oscillatory manner (flutter valve) aid sputum clearance in some patients and a variety of techniques
- Nebulized saline and mucolytics
- Maintaining good hydration reduces the viscosity of secretions

Antibiotic therapy

- In treatment of exacerbations
  - Always consider pseudomonas covering
- Long term antibiotics
  - In pt with recurrent exacerbations
    - ✓ inhaled gentamycin
    - ✓ Inhaled colistin
    - ✓ Oral macrolides (3 times weekly for 6 months)

Others treatment

- Inhaled bronchodilators
- Inhaled steroids
- Treat underlying condition
- Surgical treatment
- Surgical resection for localized bronchiectasis (poorly controlled by antibiotics),especially in young
- Bronchial artery embolization for massive haemoptysis
- Foreign body or tumour removal
- Lung transplantation in patients with cystic fibrosis

complications

- Massive hemoptysis
- Repeated chest infections
- Lung abscess
- Cor pulmonale
- Systemic amyloidosis

Prevention

- adequate prophylaxis for and treatment of measles, whooping cough or a primary tuberculous infection, are essential.
- Early recognition and treatment of bronchial obstruction are also important

Thank you